

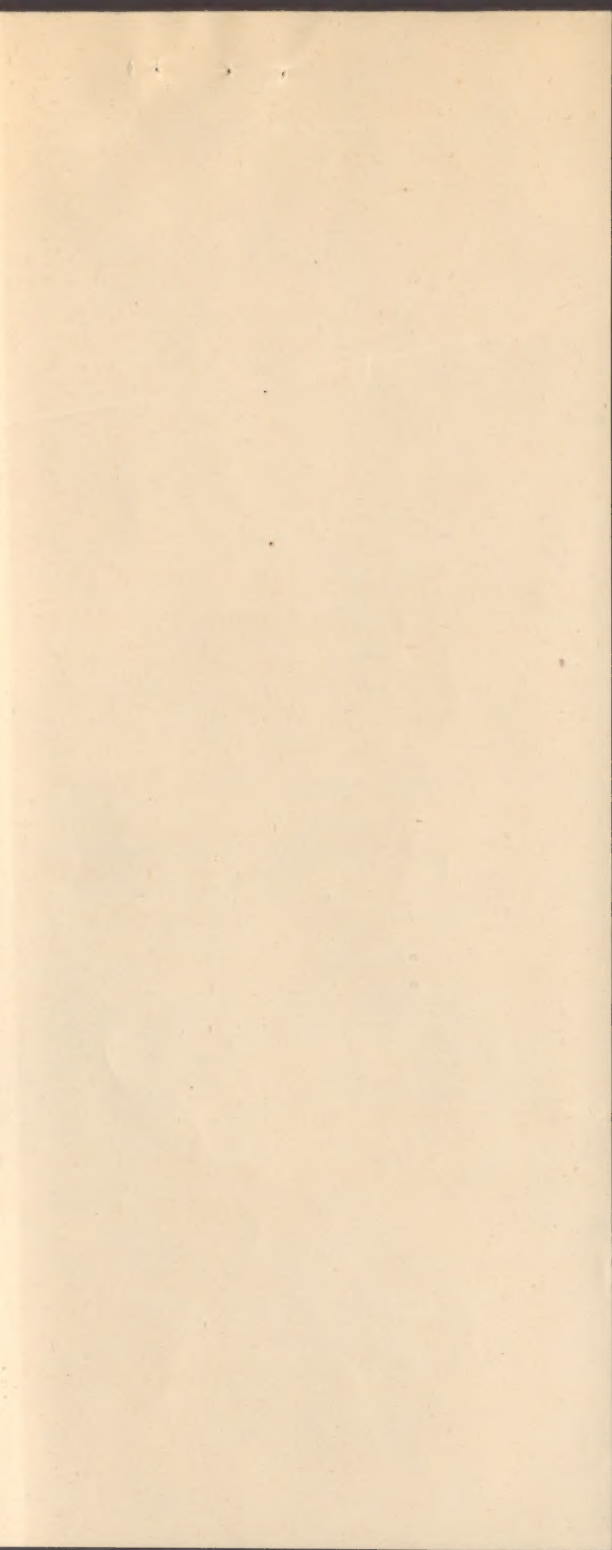
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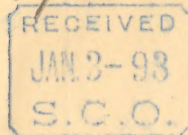
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4725-a.



Fort Ringgold, Texas,

Dec. 28th, 1892

The Surgeon General of the Army,
Washington, D.C.

Sir:

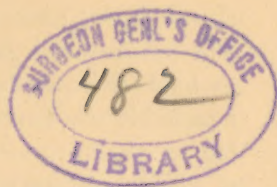
In connection with a study of the subject of physical training in the Army, the following was prepared to form the basis of a report to you upon the subject. In the hope of inspiring interest in the topic and eliciting discussion and additional information, it was published in the United Service for last April, the publisher agreeing to place a copy in the hands of every officer in the Army. No further facts have been obtained however in the months that have elapsed, and it seems useless to delay longer. Accordingly I have the honor to submit the paper as it now stands as a special report upon

THE INFLUENCE OF PHYSICAL TRAINING UPON THE DEVELOPMENT OF THE SOLDIER.

Trusting that the facts brought together, with their deductions, may meet with your approval, I remain very respectfully your obedient servant,

John F. Fisher
Captain, Medical Department, U.S. Army

4725a
S.C.O.



THE UNITED SERVICE.

EDITED BY L. R. HAMERSLY.

APRIL 1892.

THE BUILDING OF THE SOLDIER.

IN looking back over military history, it is interesting to observe how much attention has been devoted to the development of the apparatus of war,—how the closed fist was supplanted by the club, the club by the sword, the sword by the lance and arrow, these by muzzle-loading fire-arms, and these again by the rapid-firing, breech-loading weapons of to-day, each the product of unceasing, inventive study, and each revolutionizing the warfare of its epoch. On the other hand, it is startling, in contrast with the interest displayed in weapons, necessarily accessories of war, to note how little heed has been given to the development of the most important portion of the military *matériel*, the soldier himself.

An injured weapon was wont to command all the skill of an armorer especially trained in the renovation of arms; an injured soldier was left to die on the field of battle, or to beg his way through life maimed and helpless. The rapier of Toledo or the cimeter of Damascus received in their manufacture the most skillful treatment, in order that they might possess all the qualities required to make them excel in the work they were to do. Yet the power that was to wield the weapon, without which it was but an inert mass of metal, was permitted to make itself, and not rarely to be marred in the making.

This condition is not without an exception, however, for the schools for training the frames of the young Hellenes were the nuclei of Grecian life. It was the ambition of every youth to prepare himself to excel in battle for his country, and the result made possible the saying

that, "Sparta needs no other bulwarks than the bodies of her sons." The culture of the gymnasium enabled Leonidas and his three hundred to hold Thermopylæ against the Persian horde, and Xenophon to march his ten thousand to the sea, and, by the models of physical beauty which it produced, conferred imperishable fame upon the chisel of Phidias and the brush of Apelles. Running, leaping, and wrestling contributed to the growth of the lower extremities; boxing, throwing the discus, and casting the spear educated the chest and upper extremities, while the *pagkration*, a combination of boxing and wrestling, presented the qualities of both. The state encouraged athletic excellence, and the gods themselves crowned the strongest, swiftest, and most dextrous in the Olympic games. And so, among the Greeks, physical training attained an approach to perfection surpassed only in the present day.

Among the Romans, senators and consuls, even the mighty Cæsar himself, did not disdain to seek, in the game of ball and other gymnastics, amusement and healthful exercise. And although the culture of the body was never carried to the degree of refinement at Rome that it attained at Athens and Olympia, it nevertheless produced a race of men that dominated the known world.

In both these instances, when physical training ceased to be a national characteristic, and the men of brawn were succeeded by creatures of luxury, the decadence of national prosperity followed. And indeed in all history the relation between intellectual, political, and physical superiority has been constant.

But while the methods of the Greeks far exceeded in value those of other nations of the world up to the present century, and while they possessed a few unique specimens of physical development, artistic representations of which have been the wonder of later generations, they were heavily handicapped by their ignorance of the structure of the body and the functions of its components. The thought of inducing growth of undeveloped parts and bringing the entire frame into harmony had not occurred to them, although in not rare cases this was brought about incidentally. Their efforts were applied rather to the encouragement of powers already existing in the individual, to add more speed to the swift, greater agility to the nimble, a stronger arm for the swordsman, and a closer grasp for the wrestler, the ultimate aim being merely to extend the combatant efficiency of each man in the line of his natural inclinations.

Nor was the application of detailed knowledge of the body to the cultivation of strength and dexterity recognized by any one previous to our own time. But, once understood, the gymnast possessed a power of appreciating the exercise demanded for his training beyond the dreams of the ancients. The student of the human form divine early learns that but few bodies are built symmetrically. The well-

developed chest and arms are more than likely to be accompanied by spindling legs. The limbs of the left side are in a large proportion of cases smaller than those of the right. And this lack of symmetry is shown by measurement to extend to innumerable other details.

In certain occupations in particular but the one set of muscles required for their ordinary conduct is used to any extent,—one set by the shoemaker, another by the tailor, another by the wood-cutter, and another by the farm-hand, while the unemployed muscles become correspondingly weak and unresponsive from disuse. Certain professional attitudes tend to become permanent deformities by the lack of suitable exercise. The dentist, whose duties require him to bend to one side during much of the day, is apt to present a permanent curvature in that direction. The trooper, who passes many hours astride of his horse, develops bow-legs. The baker, who weighs out the loaves, becomes knock-kneed. The student, who pores long hours over his books, contracts a “scholarly stoop.” And the foot-soldier, who carries his rifle with his right arm, develops a depression of the right shoulder, to prevent which certain gymnastic exercises known as the “setting-up” drill have long been practiced.

During the long gap between the days of Lysander and Scylla and the present, warfare has passed through two essential transformations. With the ancients, individual strength and personal prowess were indispensable in a warrior, to enable him to hold his own in the series of hand-to-hand duels of which battles of that day were composed. But the invention of gunpowder dethroned individuality in combat, and gave birth to the later methods of fighting by hurling great masses of men against the enemy, as was seen in the campaigns of Napoleon, and more recently in those of Grant. Still later mutations in military methods have again removed from the soldier the encouragement of the “elbow-touch,” and under the pressure of long-range and rapid-firing ordnance the necessity for dispersed order and individual action has again arisen. Duelling, although on a modified and vastly extended scale, has once more taken the chief place in the machinery of war.

Then, while the culture of the soldier’s physique has always been of importance, now more than ever has it become indispensable. By logically following out the indications of anatomy and physiology, showing the location of each muscle, and its action with respect to each organ and limb, it has been possible to develop a series of exercises by which growth of any desired portion of the muscular system can be stimulated at will. And by a combination of exercises, touching upon each part in the proportion demanded for the purpose, the entire body can be developed into a symmetrical whole. Said an English soldier, who had passed through a brief course of training in the gymnasium at Warley Barracks, upon being asked if he felt any stronger for his practice,—

"I feel twice the man that I did, sir."

And upon being further questioned as to his exact meaning, he continued,—

"I feel twice the man that I did for anything a man can be set to do."

The object of judiciously-directed physical training could not have been more cleverly stated. It aims to induce harmonious growth in the entire muscular system, to increase the mobility of the joints, to render the extremities more sensitive to the influence of the intelligence, to strengthen and facilitate all the organic functions, to remove the tendencies to irritability and discontent almost always due to physical weakness, and, finally, by eliminating all the obstacles to its action occasioned by physical depression, to strengthen the mind itself.

The application of physical training to the development of the soldier was first made, in the modern rehabilitation of the art, by Peter Henrik Ling, the son of a Swedish Protestant minister, and himself at one time a divinity student. From a prolonged series of wanderings in foreign lands, he returned home with a broken constitution and a suggestion of the usefulness of physical training. Applying the latter to the former, he secured his own recovery to health, and with health arose a desire to give to the sick of the world the same relief that he had obtained. Appointed fencing-master at the University of Lund, he acquired from his medical colleagues a mastery of the healing art, which enabled him to adapt his exercises to the physiology of health and the pathology of disease. The essential feature of Ling's system was the theory that motion pure and simple, without the active co-operation of the subject, would suffice for the complete development of the body. As applied to the conquest of disease and the recovery of the convalescent, his method has been extensively employed under the name of the Swedish-movement cure.

Ten years later, in 1814, the government recognized his work by the establishment at Stockholm of the Central Institute of Gymnastics, where every facility was afforded him for the perfection of his system. His military gymnastics consisted of twenty-five sets of fourteen or fifteen exercises, with and without apparatus, together with certain movements under arms and swimming. Not only is great care taken with the physical education of the army at large, but non-commissioned officers displaying especial aptitude receive particular attention to qualify them for service as instructors, while cadets at the Royal Military School who display exceptional expertness are made assistant instructors at the school, in order to train them for special duty in connection with physical training upon receiving their commissions.

In Germany, although the idea of including physical culture in the soldier's training was advanced earlier, it was not adopted until thirty years after the success of Ling. Guts Muths, who was teacher of gym-

nastics in Salzmann's Philanthropium at Schnepfenthal for the fifty years preceding his death in 1839, was the pioneer of physical education, not only in Germany but throughout the Continent. The influence of his teachings was perceptible in the gymnastic renaissance under the leadership of Nachtigall, in Denmark, and even in the work of Ling, in Sweden. As early as 1804 he urged the introduction of gymnastic training into the schools as a means of increasing the military efficiency of future recruits, but the war with Napoleon distracted attention from the matter, and Guts Muths's influence upon the introduction of physical education into the German army was indirect though powerful.

A more directly influential factor in the erection of the German system was Friedrich Ludwig Jahn, affectionately called by the Turners, of which society he was the founder, "Father Jahn." In 1810, while a teacher in Berlin, it was his habit to resort with his pupils to the woods and fields on holiday afternoons, there to engage in youthful sports and exercises. From these informal gatherings or tournaments arose a society termed the *turnverein*, the members of which became known as "turners" and the physical exercises as "turning." The turnverein met a want in the German character, and, after some vicissitudes, entered upon a period of marvelous growth, until it numbered its societies by the thousand and its membership by hundreds of thousands, not only in Germany, but wherever the sons of the *vaterland* have collected in sufficient numbers, there being more than twenty thousand of them in the United States. The influence of the prevalence of "turning" upon the German physique and character has been enormous.

With the internal pressure of the Turners and the external example of the systems of Ling, in Sweden, and Nachtigall, in Denmark, it is surprising that the military adoption of physical training did not occur sooner, for it was not until June, 1842, that the King of Prussia authorized the organization of "gymnastic institutes in connection with the division and brigade schools in the army," while the establishment of the central school of gymnastics, in Berlin, was delayed four years longer.

Once inaugurated, however, the Germans pushed their system of military physical training to a high degree of efficiency. In the Berlin school two hundred lieutenants, and in the Hanover school four score lieutenants and as many non-commissioned officers, are annually qualified as instructors in gymnastic exercises, while in the infantry arm of the service alone two hundred and thirty thousand officers and soldiers are under constant instruction in physical training. Not satisfied with the utilization of pleasant weather for exercise, large buildings have been constructed where it can be continued throughout all seasons. The exercises, with a view to simplicity, were limited to as small a

number as possible for proper development, to be executed with great precision. Those for the infantry, for example, are of five classes,—exercises without apparatus, gymnastics with weapons, gymnastics with apparatus, and applied gymnastics.

The results obtained by this simple system are of the highest character. In recruiting from the German peasantry, as remarked by Prince Hohenlohe, the barracks soon fill with figures that would put to shame the most exaggerated cartoons of the comic papers. The awkward fellows, whose neglected carriage makes them look like a set of botched-up images, try hard, but in vain, to stand erect. Ill-made and undeveloped, their uniforms will not fit them, and, if altered to suit their present figure, would need to be remade when they have been remodeled by physical training. So, before teaching them a single movement of the military drill or providing them with uniforms other than canvas fatigue suits, they are taught gymnastic exercises, advancing progressively and gently from the easier to the more advanced, until finally they have command over all the muscles and joints. In this manner the recruit acquires a more symmetrical development, a natural and erect carriage, and a methodical gait; he has learned to subordinate his muscles to his will, and at the same time he has insensibly learned to submit his will to the word of command. With material thus rendered plastic and ductile, it is comparatively easy to pass on to applied gymnastics, the manual of arms, and military manœuvres. The men, having learned how to learn, acquire the new knowledge readily and rapidly, so that it requires hardly longer to teach them gymnastics and drill than to have taught them the drill alone.¹

France admitted gymnastics into her military service in 1847, and the Central School of Gymnastics at Vincennes was established in 1852. The French system is much more extensive than the German and is taught in two parts,—elementary exercises and applied exercises. The elementary exercises are performed without fixed apparatus, for which they form a preparation, and consist of various calisthenic movements progressively arranged and designed to give the soldier free movement of the limbs and ready control over his muscles. He then passes on to the applied exercises, which consist of exercises on the ladders, horizontal and parallel bars, and other stationary apparatus, together with wrestling, boxing, fencing, the single-stick, swimming, dancing, and singing. The system is essentially Gallic in character, gratifying the national taste for graceful recreation, but at the same time never losing sight of the main purpose, physical improvement.

Aside from an abortive attempt in 1822 to include gymnastics in the curriculum of the Royal Military Academy at Woolwich, no effort was made to introduce physical training into the British military ser-

¹ The German system of military gymnastics has recently been revised and extended under the direction of the Emperor Wilhelm II.

vice until the Crimean War taught the necessity for it. Two especially qualified officers, one a medical officer, were then sent abroad to examine into the systems of gymnastics employed in the armies of the continent, and, as recommended in their report, a school for training non-commissioned officers as instructors for the army was established at Aldershot in 1861, having as a nucleus certain men who had previously been instructed in the gymnasium at Oxford. The success achieved at the Aldershot school was so marked that, some ten years later, under the orders of Lord de Grey, gymnasiums were projected at every military station throughout the British possessions, so that each soldier might have at hand every appliance necessary for complete bodily exercise during the entire year.

The system of training employed was laid out by Archibald Maclaren, of the gymnasium at Oxford, and published in 1862, under the title of "*A Military System of Gymnastics.*" It aims first to develop the physique of the recruit, and, second, to contribute strength and mobility to the frame of the trained soldier. Three months' gymnastic training is required of every recruit during his ordinary drill, or, if advised by a medical officer, in lieu of part of it; it occupies one hour a day, the military drill taking up two or three hours in addition. The training is supervised by a medical officer, who is responsible for its proper performance, with authority to continue the exercise beyond the prescribed time if necessary. The trained foot-soldier is required to pass through a three months' course of training every year, consisting of an hour upon each alternate day, while the mounted troops engage in still other exercise.

Maclaren's code is divided into six courses, each complete in itself, and each an advance upon its predecessor. He is inclined to disparage free gymnastics without apparatus, and gives very limited space to them. His first course contains a few exercises of this kind, but dumb-bells and bar-bells are promptly taken up. The second comprises simple exercises in walking, running, and leaping, together with work upon the horizontal beam, the vaulting-horse, parallel and horizontal bars, rings and ladders, ropes and walls. The third, fourth, and fifth, called respectively medium, advanced, and arduous exercises, are progressively-arranged series of movements with the same apparatus. The sixth course is the practical application of the preceding exercises.

Other European armies, notably the Danish and Swiss, have excellent systems, practically modifications, however, of those to which reference has been made.

In the United States the first move towards the introduction of physical training into the military service appears to have emanated from the medical department, acting Surgeon-General Heiskell having, in 1842, recommended to the Secretary of War the establishment of a regular course in "*gymnasticks*" at West Point. It was not until six-

teen years later, however, that Lieutenant J. C. Kelton, now adjutant-general of the army, but at that time an instructor at the Military Academy, arranged the first systematic course of physical training in the institution. In his programme, one hour a day was devoted by each class to physical training for three-fourths of the year. The subject did not become part of the work of a recognized chair, and, when Mr. Kelton's detail expired, its importance failed of recognition from the rest of the faculty, each of whom was interested in his own field of study; and it was relegated to a secondary position, finally falling into its present status, where it is taught only to the "Plebes." During the remaining three years of the course its place is occupied in a necessarily defective manner by work in the riding-hall, where feats of strength and agility are encouraged in connection with the school of the soldier mounted. In 1881, under the direction of Lieutenant Farrow, the interest of the cadets in military gymnastics was heightened by the enthusiasm of that officer, who prepared a valuable manual of the subject. Since 1883 the academy has been fortunate in the services of a swordmaster, who is an accomplished instructor in gymnastics, and, under his direction, the work done in physical training by the "Plebes" is by far the best that has ever been done in the institution. Greatly hampered in many ways and confined within too narrow limits, the striking progress in physical development made under his instruction is a significant indication of the results that might be attained under a broader and more liberal policy.

The prominent place now taken by physical training in civilian educational institutions brings the needs of the West Point system into more pronounced relief. The most conspicuous are three in number,—(1) the demand for systematic physical culture after the first year; (2) the need for medical supervision of the work as required in the British and other services; (3) the necessity for a recognized chair devoted to hygiene and physical culture, such as now exists in all other high-grade institutions of learning in this country. There are still other flaws in the system, but they are comprehended in these three, the correction of which would beyond question result in the rehabilitation of the entire subject.

Until within hardly more than a year, West Point has been the only military station at which any attempt to give systematic physical training was made. But in 1890 orders were issued directing the establishment of gymnasiums and the instruction of the men in gymnastic exercises at the recruiting depots at David's Island, New York, Columbus, Ohio, and Jefferson Barracks, Missouri. As might have been expected, the movement was hailed with delight by the soldiers. The exercises, affording an agreeable relief from the monotonous routine of garrison life, were an inspiration to the men mentally and physically. An immediate improvement was observed not only in

their deportment and habit, but in their manner and temper. These striking results were obtained in gymnasiums ill adapted from buildings constructed for other purposes, with an extremely meagre outfit of apparatus, and all the other disadvantages unavoidable in a new departure under inexperienced leadership. Nevertheless, so conspicuous have been the benefits derived from the system that the officers in charge unhesitatingly urge its extension to all military posts,—an instance of the repetition of history, the British army having had a similar experience twenty years before.

Symmetry and harmony being the chief aim of physical culture, the first essential in entering upon the study is a knowledge of the location of one's bodily deficiencies. This is obtained by certain measurements and tests of strength and capacity, the apparatus necessary for which includes a steel tape-measure, a large pair of calipers, several spring dynamometers, a spirometer, a manometer, a pair of suspended rings, and a set of parallel bars.

From the earliest times it has been recognized that weight, height, and breadth have been in direct proportion to the strength. The remark, "There were giants in those days," indicated the existence of beings of huge size and corresponding strength. And this idea is correct in the main, but in many instances it is far from true. Weight may be due to deposits of fat, tending to produce weakness rather than strength. Height may be due to excessive length of legs or neck, both elements of weakness. Breadth may exist with flaccid muscular tissues and with adipose deposits, these being in no sense a representative of strength. As already remarked, there is usually a great lack of harmony between the development of various parts of the frame, and in this disproportion may lie the source of great physical debility.

All these and similar facts unite to demonstrate the necessity for detailed tests, involving all portions of the frame, in order to obtain a correct idea of the physical powers. The measurements, in accordance with this theory, published by Professor D. A. Sargent, of Harvard, have inaugurated a new era in physical education. His data are of ten kinds, comprising (1) the *weight*; (2) the *height*, from the floor, of the knees, the pubic arch, the breast-bone and the body, standing and sitting; (3) the *girth* of the head, neck, chest, waist, hips, thighs, knees, calves, insteps, upper arms, elbows, forearms and wrists; (4) the *depth* of the chest and abdomen; (5) the *breadth* of the head, neck, shoulders, waist, and hips; (6) the *length* on each side from shoulder to elbow, elbow to tip of middle finger, of the feet, and of the body laid horizontally; (7) the *stretch* of the arms; (8) the *capacity* of the lungs; (9) the *strength* of the lungs, back, chest, upper arms and forearms; and (10) the *development* of the body. In order to obtain the measurements of the typical man, a composite has been made from a large number of measurements, and in training the effort is made to approx-

imate the individual as nearly as possible to the proportions of this type.

The collection and collation of the measurements of man—anthropometry—has been found to be of the greatest benefit to human kind. To the physician, especially in his new function of health-adviser, now becoming more prominent every year, its value is incalculable in enabling him to locate the weaker points of his patients and more intelligently to prescribe means for avoiding illness or renewing health. To the painter in search of the ideal form it is a mine from which he may obtain the purest gems for his canvas. To the sculptor it is a treasure-house from which he may draw for embodiment in marble the noblest ideals of the human figure. To the ethnologist in the study of racial characteristics, to the sociologist in considering economical and social problems,—in fact, to the student of every question in which living humanity is involved, these data are of the greatest value. In no place can so complete series of measurements be obtained as in the military service. Beginning with the boyish “plebe” or the raw recruit, and extending through the various gradations of promotion or re-enlistment to the field-officer or the pensioner, a vast series of measurements following out the physical history of thousands of individuals may be produced, the value of which to future generations is beyond estimate.

In entering upon the physical education of a civilian, in the majority of cases marked defects require special exercises from the beginning, but in the soldier the instructor has a man who, although possibly undeveloped in certain respects, must present no actual physical disability. A defect, almost universal, however, is lack of harmony in muscular power. To correct this, certain calisthenic exercises have been devised without apparatus, and corresponding rather to what the French call *exercices propres à l'assouplissement*; while they undoubtedly contribute to physical development, they are designed chiefly to cultivate quickness in movement and responsiveness to command. The four exercises known to readers of Upton's *Tactics* as the “setting-up drill” were distinctly of this class, and were so efficient in creating a soldierly deportment that in the system of tactics now in preparation thirteen new exercises have been added to them. This extended “setting-up” drill is designed for exclusive use only where general instruction in gymnastics is impracticable. When practicable it is to be enlarged by the addition of a considerable number of similar exercises to be executed at the word of command. The variation prevents the degeneration into a merely mechanical operation without spirit or mental occupation, the novelty of new exercises continually maintaining the interest.² Additional diversion is contributed by the introduc-

² A system of calisthenics for this purpose has long been in preparation by Mr. Koehler, and will shortly be issued to the army.

tion of the wand, which in the case of mounted troops may be a sabre, and in the foot forces a ramrod. In the gymnasium, dumb-bells, barbells, and Indian clubs add still greater variety, so that in the hands of a competent instructor an infinite diversity of movements may command the interest and enthusiasm of a man throughout his entire service.

In the best gymnasiums at the present time, the arms, chest, and back are cultivated largely by the use of chest- and rowing-machines. These combinations of cords, pulleys, and weights are so arranged as to permit an extensive variety of exercises, all of which tend to increase the breathing capacity and the muscular development.

To the soldier in particular a correct gait is a matter of the greatest importance, since he may be called upon at any moment to march long distances on foot. In modern warfare, where it is desired to obtain from the men the greatest amount of work with the least exertion, the consideration of the method of walking that will carry the soldier to his destination with the least fatigue is one of the most important studies. There was a Russian regiment who were taught a gait consisting of alternately lifting each foot as high as the other knee, in the manner of a high-stepping horse, but such methods have long been abandoned for more natural gaits.

Of practical importance nearly equal to walking is running. The soldier practices running at first for only short distances and slowly, and, as he advances additional grades in his training, he is perfected in running at half and at full speed and for longer distances.

Leaping is an exercise of hardly less service than walking and running. And this is particularly true in the new tactics, where individuality is so important a factor. At the storming of Le Bourget in the Franco-Prussian War, the Prussian grenadiers in the affair at the church pressed in unbroken line through the windows, leaping successively twice the height of a man down into the nave. Untrained troops could never have done this, and confusion and rout would have followed the attempt. Undoubtedly, jumping in heavy marching order and in the excitement and flurry of battle is a very different thing from the quiet definite leaping of the drill-ground, but the drill gives the soldier not only complete control of his muscles and joints, but a knowledge of his powers and a confidence in himself which doubles his value in war. Consequently the soldier must learn to leap unassisted to as great a height and over as wide a space as possible, and this both standing and running. He must be taught to jump to the rear and to leap sideways, to leap to a depth and to perform combinations of these exercises. He must also learn to avail himself of the assistance of a swinging rope and of the more familiar jumping-pole, both of which add materially to his power.

Proficiency upon the horizontal beam may make the difference

between life and death. A round beam, nine or ten inches in diameter at one end and six or seven at the other, and adjustable at various heights, is the apparatus used. Though undoubtedly of value in muscular growth, exercise here is of particular service in training the co-ordinating faculties of the brain; as a matter of fact, it is physically as easy to walk the beam when elevated hundreds of feet in the air as when laid upon the ground. The Alpine hunter and the renegade Apache without hesitation mount to the dizzy heights and unconcernedly walk along the margins of the deepest cañons. The horizontal beam gives to the soldier the mental discipline and physical confidence necessary to enable him to perform similar services for his country. A tree felled across a fathomless abyss will be bridge enough for him; sure-footed and self-confident, his training will be of equal value to him in leading a surprise upon an enemy over-confident in the protecting power of surrounding depths, or in escaping from the loftiest prison-walls. The exercises on the beam include sitting in various positions, arising to the feet, walking and passing another person, teaching the maintenance of equilibrium under all circumstances and in all positions.

Vaulting is another exercise, the connection of which with the soldier's proper duties is so evident that it cannot be omitted from his training. Beginning with a bar adjustable at heights varying from three to six feet, he is taught to vault upon and over the bar running and standing, with both hands and with one. After he has become expert in this preliminary practice he is introduced to the vaulting-horse, a rude wooden imitation of a horse's back, adjustable from the height of a toy pony to that of the great Norman horse. The training includes vaulting into the saddle in various ways, with one or both hands, vaulting over it in both ways, vaulting to the neck and to the croup, turning about in the saddle, and a great variety of motions. While these exercises are of especial service to mounted men in preparing them for manœuvring with their horses, they are of almost equal value to the foot-soldier, for they bring into action and extensive motion almost every muscle of not only the extremities, but the trunk itself.

It is not sufficient for the trooper to be taught to mount and dismount with precision, to saddle and unsaddle with approximate correctness, and to bring the horse to a walk, trot, or gallop, according to orders. He should be a master of horsemanship, and he should not be allowed to touch the noble creature which is to be intrusted to his care until he has completely mastered the vaulting-horse. Then, already familiar with the most difficult methods of mounting, already habituated to the correct manner of sitting his horse, with his muscles trained to act and his joints trained to yield quickly to them, not only is the acquisition of the equestrian art made easier for him, but he is able to

acquire a much more complete mastery of it. Then proceeding from the inanimate to the animate, he readily learns to ride properly without straining his horse, and to perform the various methods of mounting and dismounting with his horse at rest and in motion; he rides with and without a saddle, he learns to protect himself by hanging at the side of his horse, and he picks from the ground anything from a cartridge to a comrade without dismounting.

The exercises upon the parallel bars, the trapeze, the swinging rings, the horizontal bar, and similar apparatus found in every gymnasium, while not directly applicable in the soldier's work, will contribute efficiently to the strength, suppleness, and self-command sought for in every military unit.

In the climbing exercises, however, we arrive at movements useful not only in physical development, but in the profession of arms also. On ladders, climbing with both hands and feet in the ordinary way, with the feet or hands only, and with numerous modifications of these, are useful. Climbing poles and ropes are expedients which war is more than likely to impose upon the soldier, and these, too, are of use in the general physical development. Scaling blank walls by means of crevices into which the finger-tips and toes can barely slip is a most arduous exercise, requiring long previous experience for its accomplishment, but the ability to execute the feat may mean life and liberty to the prisoner of war. Where there are no crevices, their absence is no obstacle if a comrade or two be at hand and the top of the wall is not projecting, for a ladder of men may be formed leaning against the wall one above the other, up which all may climb to liberty or victory. But even with an overhanging top, the wall may be surmounted by the formation of a pyramid. And previous gymnastic practice makes all this easy for the soldier.

An exercise which is omitted from most works on physical training, but which is of the greatest practical value both from the stand-point of physical development and of utility in peace and war, is swimming. It is particularly an essential feature of the soldier's education. The ability to cross a deep stream may be the solution of a strategic problem, while the story of the life-saving application of the art is almost too trite to quote. It should be learned in all its phases, both as a means of training and as a practical application. With a view to scouting and reconnoitring, swimming with masses of straw or similar *débris* upon the head, carrying arms and clothing in like manner and leading a horse or swimming with his assistance should be learned. And a most important practical element of this exercise is practice in rescuing and resuscitating the drowning.

A feature of the French system, at which advocates of other systems are inclined to look with contempt, is singing. But no greater mistake could be made. Aside from its value in strengthening and adding to

the carrying qualities of the voice, it is invaluable as a means of improving the lungs,—giving “more wind,”—and contributes strength and fulness to the muscles of the throat, chest, and abdomen. In the United States army, in which there is a large proportion of young men from foreign lands who have entered the service as a means of becoming identified with their adopted country, the value of instruction in national songs, as a means of developing patriotic sentiments, cannot be too highly regarded.

In the infantry and cavalry the bayonet and sabre drill are taught respectively, while the embryo officers of West Point learn fencing and the broadsword. Boxing and single-stick are taught in some armies, and may be of great service, for the time comes in every man’s life when a mastery of the manly art of self-defense may be of use in protecting himself or others. A forcible illustration of the value of such training was seen in a London street, when a slightly-built soldier rescued a miserable woman from the blows of a brutal husband of twice his strength, using only the little switch which Tommy Atkins invariably carries when off duty. This he plied so industriously about the head and face of the wife-beater, at the same time dextrously avoiding most furious onslaughts in return, that he sent his antagonist home blubbering like a baby, and himself sauntered unconcernedly away untouched and unruffled.

The merits of physical culture are so obvious and the benefits so conspicuous that the unavoidable enthusiasm is liable to degenerate into a craze, when excesses may produce the most disastrous consequences. It is stated that, of thirty-two all-round athletes in a New York club six years ago, three are dead of consumption, five have to wear trusses, four or five are lop-shouldered, and three have catarrh and partial deafness. While exercise judiciously prolonged is of incalculable benefit in the growth of body and mind, yet exercise in excess produces a contrary effect. The “muscle-bound” athlete is frequently seen; less common, but by no means unknown to medical science, is the man with muscles wasted from excessive use, an affection not unusual in ballet-dancers. Lifting heavy weights is a frequent cause of spinal disease and paralysis. Professor Leuf, himself an expert in the national game, has described the base-ball “pitcher’s arm,” a condition of overtaxed function involving all the anatomical elements of the upper arm. The over-enthusiastic bicyclist half cripples himself, and the “tennis-arm” is seen in both sexes.

Recognizing these dangers, Ling, before completing his system, qualified himself in medicine, and in the present day the best teachers of physical training are medical graduates. The British and other army regulations require gymnastics to be under the supervision of a medical officer. Not only is this demanded by the danger of injury from the abuse of exercise, but because no one who has not had a care-

ful training in physiology and pathology and an extensive observation of both diseased and healthy conditions can fully appreciate the indications and contra-indications for the training of defective parts. The physiognomy of disease stamps itself not only upon the face, but upon every portion of the body, and weaknesses not apparent to the untrained eye will be noted at once by the expert diagnostician. No provision for physical training, then, is of greater importance than authoritative medical supervision.

The results of properly-applied physical training are marvelous. In the class of non-commissioned officers through which gymnastics were introduced into the British army, the muscular additions to the arms and shoulders, says Maclaren, were so great as to have absolutely a ludicrous and embarrassing result, for before the fourth month several of the men could not get into their jackets without assistance, and when they had gotten into them they could not make them meet by a hand-breadth. In a month more they could not get into them at all, and new clothing had to be procured, pending the arrival of which the men had to go to and from the gymnasium in their great-coats. Among these men the smallest gain was five pounds in weight, and an inch each in girth of chest and arm; the largest gain was sixteen pounds in weight, and in girth of chest and arm five inches and an inch and three-quarters, respectively; while the average gain was ten pounds in weight and in girth of chest and arm three inches and an inch and a half, respectively.

Results even more astonishing were obtained in the gymnasium of the recruiting depot on David's Island, where in one month a class of seven men gained in girth an average of an inch and a half at the chest, and three-quarters of an inch at the arm, while one man made the remarkable increase of two and a quarter and one and a quarter inches. In the eight months to which physical training is limited at West Point equally notable results are obtained, one cadet in the last class gaining four and a half inches in girth at the chest and an inch and a half at the arm.

The significance of these figures is far greater than appears on the surface. The influence of the enlargement of the chest alone cannot be computed; the greater expansion permitted to the lungs, the greater play allowed to the heart, the greater amount of oxygen introduced into the system, the greater excretion of effete matter from the blood, with their secondary effect upon every cell and organism in the body, cannot be expressed. The increased girth of the extremities is not the only indication of their added strength, for it does not take into account the firmness and contractile power gained even before the growth began. The quickened sympathy between the brain and the muscles cannot be shown by any test. The suppleness, the agility, the self-confidence that have developed, cannot be represented by figures. The

added keenness of perception, the comfort, joy, delight, which existence alone gives, cannot be estimated, much less represented.

In the United States army but little has been done towards the creation of a system of physical training. At West Point a splendid gymnasium is in course of construction, although as yet no appropriation has been made for furnishing it with apparatus; in the medical department of the army are several officers of the highest repute as hygienists; and in the swordmaster the Academy has an accomplished teacher of gymnastics. In the combination of these three elements into a department of hygiene and physical training with complete anthropometric records, with general training to increase the physical capacity and special training to remedy deficiencies developed by illness or other causes, and with complete scientific instruction in physiology and hygiene, as required by law, the Military Academy has the means, with the assent of Congress, of at once proceeding with physical training in a manner equal to any military training-school in existence. From here, then, may in course of time be sent into active service a body of trained teachers thoroughly qualified for the instruction of the enlisted soldier.

For the enlisted men, also, but one step remains to be taken. Two or three of the larger posts have gymnasiums, furnished by subscription, in which the men have found recreation and amusement, and excellent work with poor facilities has been done at the three recruiting depots. When the gymnasiums projected for the depots shall have been completed, a continuation of the existing judicious regulation requiring all recruits to spend an hour a day in gymnastic exercises under skilled supervision will provide for the service a nucleus of partially-trained men. All that remains to place physical culture upon the basis shown by the experience of all other armies to be necessary is its extension to include other enlisted men as well as the recruits. The country can hardly afford to end the physical training of the soldier with his entry into his regiment; the value of the training at the depot would then be lost, for in the reaction the muscular activity would be supplanted by muscular inertia. Neither can it afford to omit from the training of its soldiers methods which the civilized world has learned by practical tests to be essential for obtaining from them the best service. When the superior physical training of one of the parties to so great a contest as the Franco-Prussian War is known to have been the force that turned the tide of victory in its favor, the United States cannot afford to reject it. Since training the men to physical vigor will result in keeping from the pension rolls names of those who would otherwise speedily degenerate into dependents upon the nation's bounty, practical economy itself dictates its adoption.

Moreover, it will not only result in a vast increase in the efficiency of the military service, but it will have a broader influence upon the

entire commonwealth. As the years pass by, it will throw out into the community, upon their discharge from the army, a class of men by their physical development and mental capacity qualified to be more than ordinarily useful citizens. By its necessary extension to the large number of military schools, it will encourage healthful tendencies and manly inclinations in the youth of the country. Through its adoption by the National Guard, always quick to absorb the best features of the regular service, it will disseminate physical development and intellectual activity throughout the young men of the nation. In every class of society, in every grade of life, wherever health is understood and length of life desired, its influence will be felt and its effects appreciated.

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